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Joint Photographic Intelligence Report

COMMUNICATION INSTALLATIONS IN TBILISI/RUSTAVI AREA, USSR

[redacted]

ARMY CIA

PIC/JR-4/60

FEBRUARY 1960

[redacted] 25X1

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COMMUNICATION INSTALLATIONS

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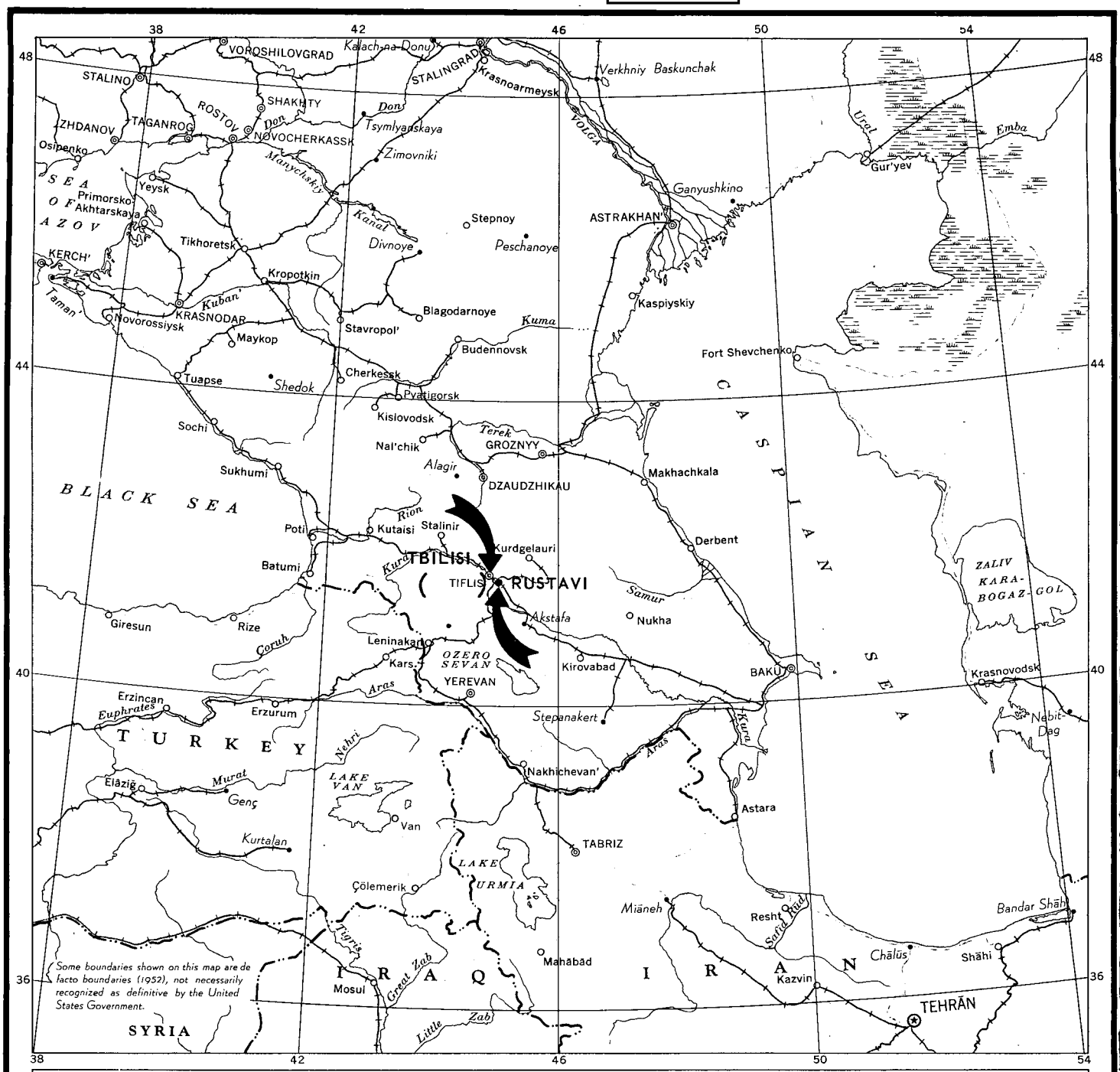
PREFACE

This joint photographic intelligence report has been prepared by the Army and the Central Intelligence Agency. It is in response to Army requirement SRI-196E-58 and CIA requirement RR/E/R-140/58, which request detailed information on all visible communication facilities in the Tbilisi/Rustavi area of the USSR, and to that portion of CIA requirement SI/R-19/58 which pertains to the communication facilities at Rustavi. The report confirms and supplements Navy Report NT-P0007 [redacted] and Air Force Report T50-20 ([redacted]

25X1

TABLE OF CONTENTS

25X1



U. S. S. R.

CAUCASUS

International boundary
National capital
Road (selected)
Railroad (selected)

Scale 1:8,500,000

0 100 200 300 Miles
0 100 200 300 Kilometers

Base 11960 3-52

I. INTRODUCTION

This report presents a detailed photographic analysis, based on [redacted] 25X1 photography, of seven communication installations in the Tbilisi/Rustavi area of the USSR. The area of analysis, which is confined to within a 45-mile radius of Tbilisi, contains a wide variety of communication facilities, including commercial and point-to-point communication installations, a possible jamming station, a Krug site, a high-frequency broadcasting station, and a television station. The Krug site will be covered in a forthcoming PIC report; the broadcasting station is discussed in CIA/PIC/JR-29/59, Five Soviet High-Frequency Broadcasting Stations, December 1959 [redacted]

25X1 Although the quality of the aerial coverage is good, most of the installations are covered only by oblique photography. However, for two installations, ground photography of usable quality was available to aid in interpretation.

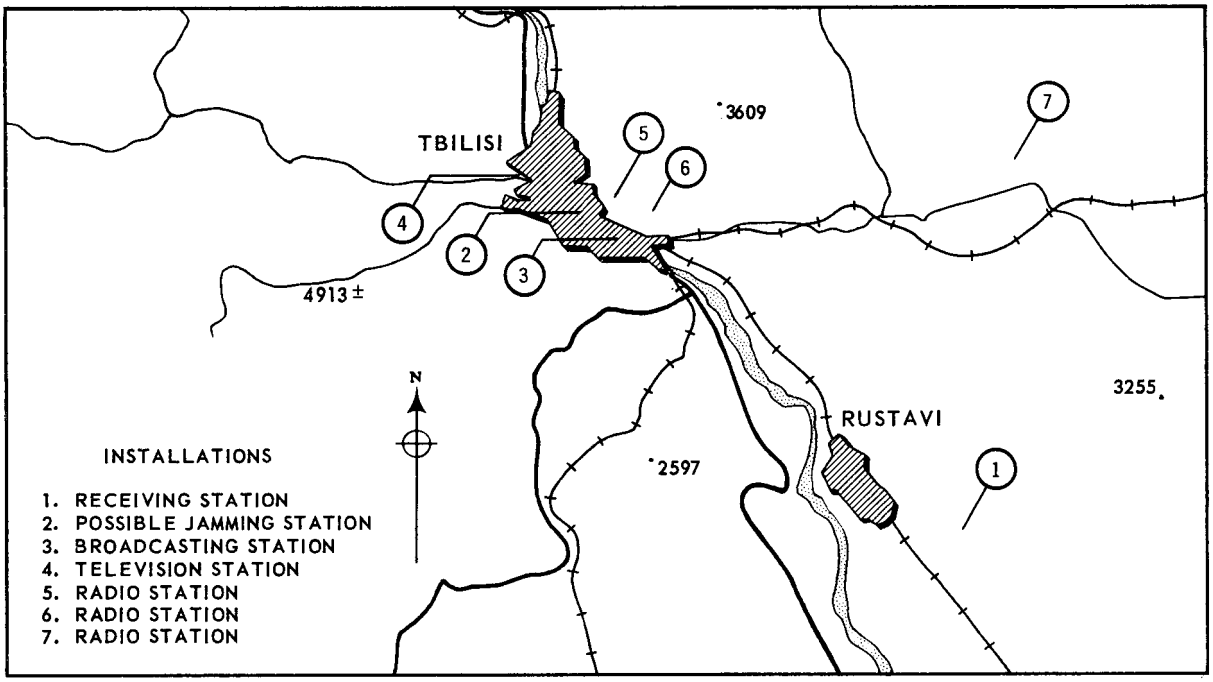


FIGURE 1. DETAILED LOCATION MAP. This map shows the location of the seven communication installations described in this report.

All distances, which are in statute miles, are measured primarily from the Tbilisi railroad station (41°44'40"N/44°46'30"E). For convenient map and table reference, the installations discussed have been numbered from 1 through 7. The type designations of the fishbone antennas at installations No. 1 and No. 7 are in accordance with the system established in CIA/PIC/TP-1/59, Designation of Fishbone Antenna Configurations, June 1959

25X1

II. INSTALLATION NO 1, RUSTAVI RECEIVING STATION (41°30'N/44°52'E)

This receiving station, one of the largest known receiving stations in the USSR, is 23.2 miles southeast of the Tbilisi railroad station and 6.1 miles east-southeast of Rustavi (Figure 1, item 1). The installation is similar in appearance to a station at Saryagach (Installation No. 2 in PIC/JR-25/59). It is road-served and covers approximately 651 acres. For convenience of description, the station has been arbitrarily divided into two areas: an operations area and a support area (Figure 2).

The operations area (Figure 3) is a fenced antenna farm which covers 465 acres (1,566 by 1,500 yards). It includes a walled section, yards, which contains a control building; 7 support buildings; and 40 fishbone and 8 double rhombic antennas. All the antennas apparently are used for reception, since no cooling facilities or dissipation lines are visible. The orientation and location of several of the antennas evidently provide space diversity reception.

25X1

The support area is south of and contiguous to the operations area. It contains administrative-type buildings, housing, and support facilities (Figure 4). The area, which encompasses 186 acres, is connected by a service road to the control building in the operations area. The support

area as a whole is not fenced, although two small sections are fenced (one on only two sides). No visible power lines serve either the operations or support areas, but a possible thermal power or heating plant is located in the support area (Figure 4, item 63).

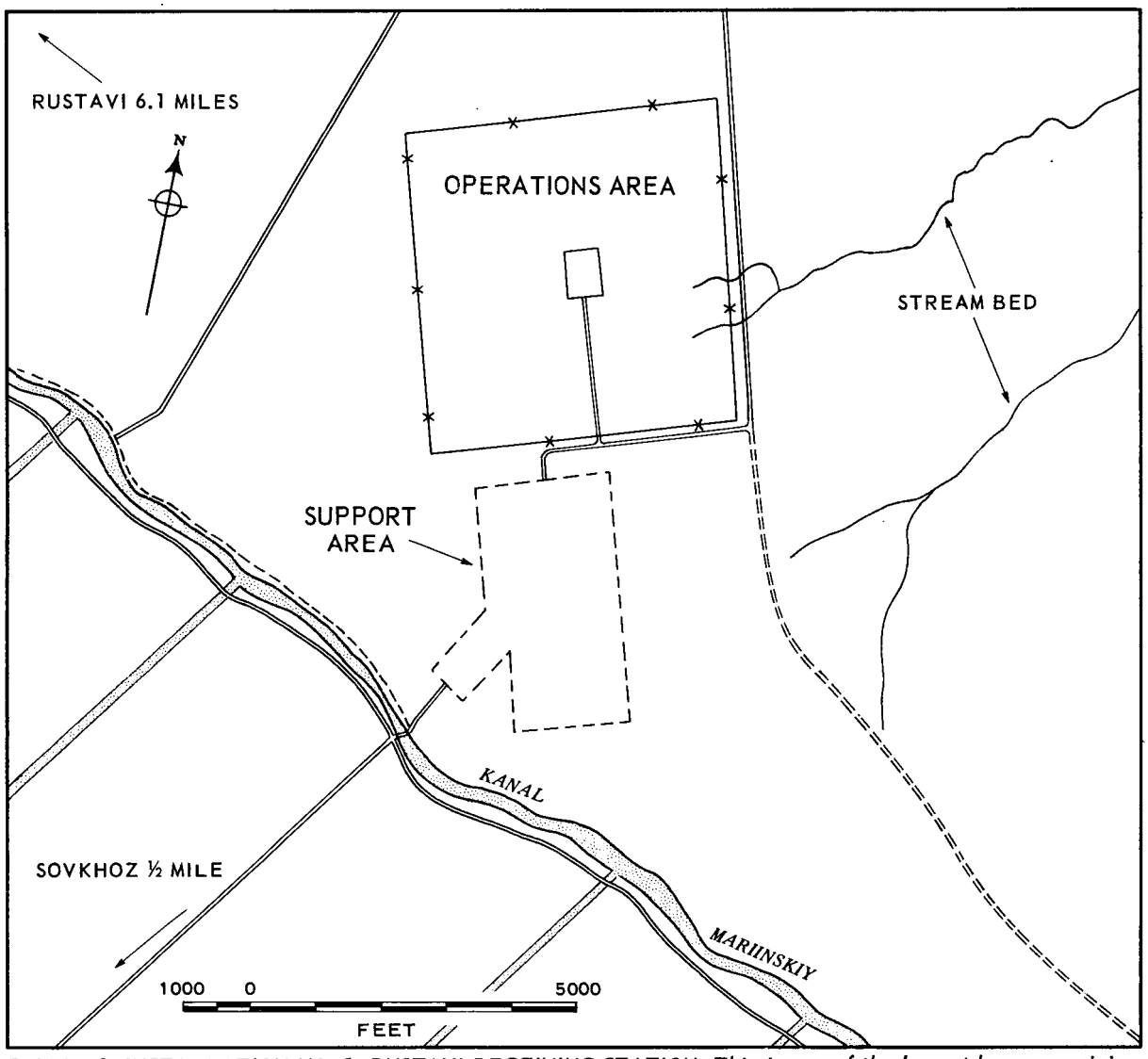


FIGURE 2. INSTALLATION NO. 1, RUSTAVI RECEIVING STATION. This is one of the largest known receiving stations in the USSR.

A. Antennas

The 40 fishbone arrays are of types normally found in Soviet receiving sites. Three arrays (Figure 3, items 8, 16, and 21) are multiples of standard

array patterns, resulting in a greater receiving capability. The fishbone types present are B, D, F, K, and L (these are described and illustrated in CIA/PIC/TP-1/59). The type F antennas (items 28-40) have poles [redacted] feet high. The type B, D, K, and L antennas (items 1-27) have poles [redacted] feet

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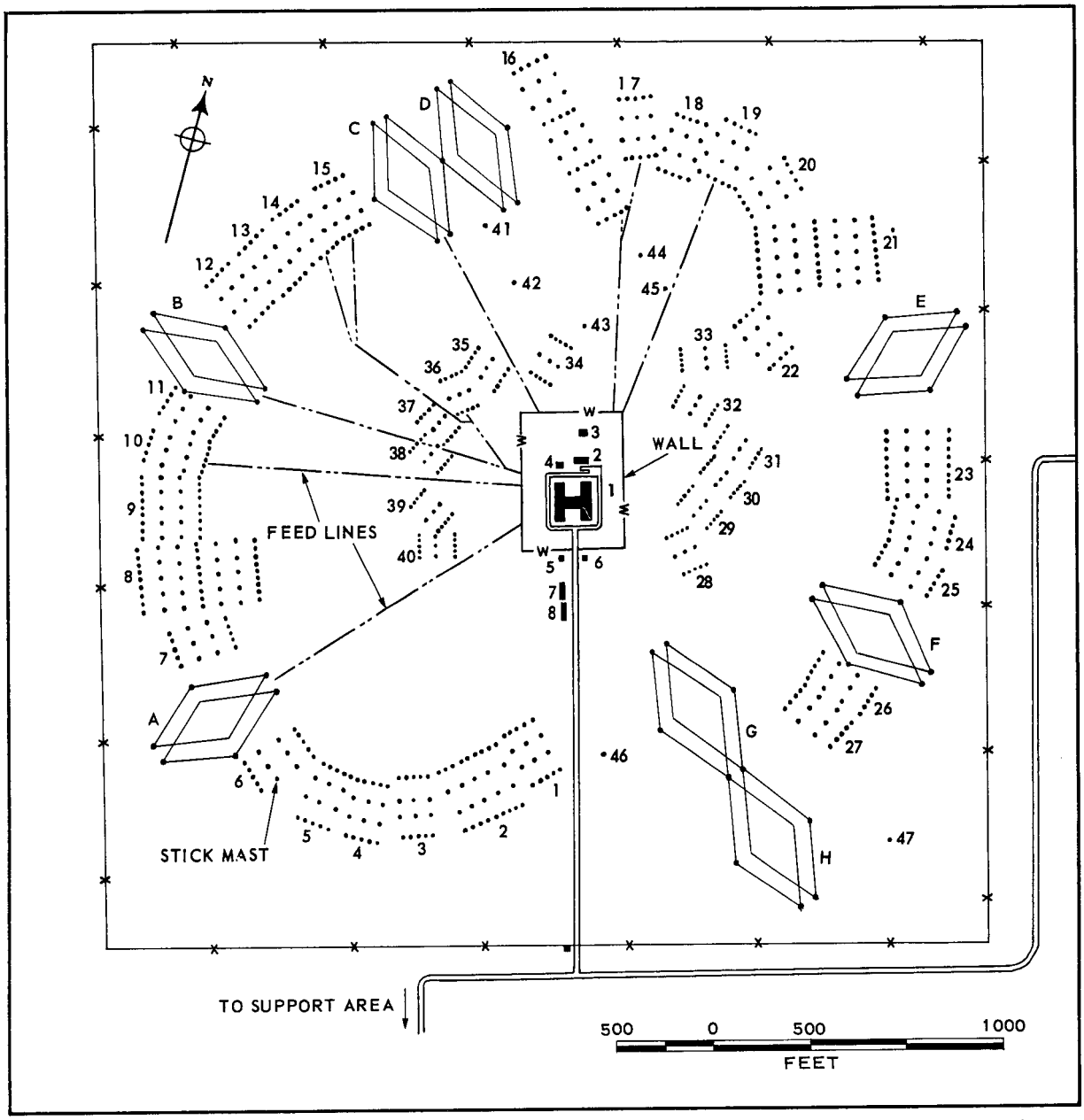

FIGURE 3. OPERATIONS AREA AT INSTALLATION NO. 1. The placement of the antennas provides 360-degree coverage.

PIC/JR-4/60

Table 1. Fishbone Antennas, Installation No. 1

25X1

Antenna No.	Type	Dimensions (ft.) Length Width	Azimuth Orientation (°)	Antenna No.	Type	Dimensions (ft.) Length Width	Azimuth Orientation (°)
1	B			21	L		
2	D			22	B		
3	B			23	D		
4	B			24	B		
5	B			25	B		
6	B			26	B		
7	B			27	B		
8	L			28	F		
9	D			29	F		
10	B			30	F		
11	B			31	F		
12	B			32	F		
13	B			33	F		
14	B			34	F		
15	B			35	F		
16	K			36	F		
17	B			37	F		
18	B			38	F		
19	B			39	F		
20	B			40	F		

25X1

high. Since there are no apparent cooling facilities or a power supply, the eight rhombic antennas (items A-H) are probably also used for reception. The placement of the fishbones and rhombics provides 360-degree coverage.

In addition to the fishbones and rhombics, the operations area contains seven stick masts (items 41-47), the purpose of which cannot be determined. Although their exact height cannot be given, it is estimated that they range from 90 to 130 feet high. Tables 1 and 2 give data on the fishbone and rhombic antennas, respectively (antennas are keyed to Figure 3).

Table 2. Rhombic Antennas, Installation No. 1

25X1

B. Structures

The structures in the operations area as of [redacted] 25X1 are tabulated in Table 3 (item numbers are keyed to Figure 3).

Table 3. Structures in Operations Area, Installation No. 1

Item	Identification	No. of Stories	Roof Type	Dimensions (ft.)
1	Control building, H-shaped	1	Valley	216,000 sq. ft.
2	Support-type bldg.	1	Gable	70 x 45
3	Support-type bldg.	1	Gable	30 x 15
4	Support-type bldg.	1	Gable	20 x 10
5-6	Guardhouses	1	Gable	20 x 20
7	Support-type bldg.	1	Gable	125 x 35
8	Support-type bldg.	1	Gable	75 x 25
9	Guardhouse	1	Gable	20 x 20

Table 4 gives data on the structures in the support area as of [redacted] 25X1 (item numbers are keyed to Figure 4).

Table 4. Structures in Support Area, Installation No. 1

Item	Identification	No. of Stories	Roof Type	Dimensions (ft.)
1	Support-type bldg.	1	Gable	[redacted]
2	Support-type bldg.	1	Gable	55 x 25
3	Support-type bldg.	1	Gable	60 x 30
4-7	Support-type bldgs.	1	Gable	[redacted]
8	Support-type bldg.	1	Gable	
9-10	Support-type bldgs.	1	Gable	
11	Support-type bldg.	1	Gable	
12	Support-type bldg.	1	Gable	
13	Support-type bldg.	1	Gable	
14	Support-type bldg., T-shaped	1	Valley	bar) stem)
15	Support-type bldg.	1	Gable	
16	Support-type bldg.	1	Unknown	
17	Support-type bldg.	1	Gable	
18	Support-type bldg.	1	Gable	
19	Support-type bldg.	1	Gable	155 x 60
20	Support-type bldg.	1	Gable	180 x 70
21	Support-type bldg.	1	Gable	[redacted]
22	Support-type bldg.	1	Gable	145 x 55
23	Athletic field	---	-------	520 x 255
24a	Open storage	---	-------	140,000 sq. ft.
24b	Open storage	---	-------	33,000 sq. ft.
25	Support-type bldg.	1	Gable	[redacted]
26	Support-type bldg., L-shaped	1	Valley	220 x 65 (stem) [redacted] (base)

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continued

25X1

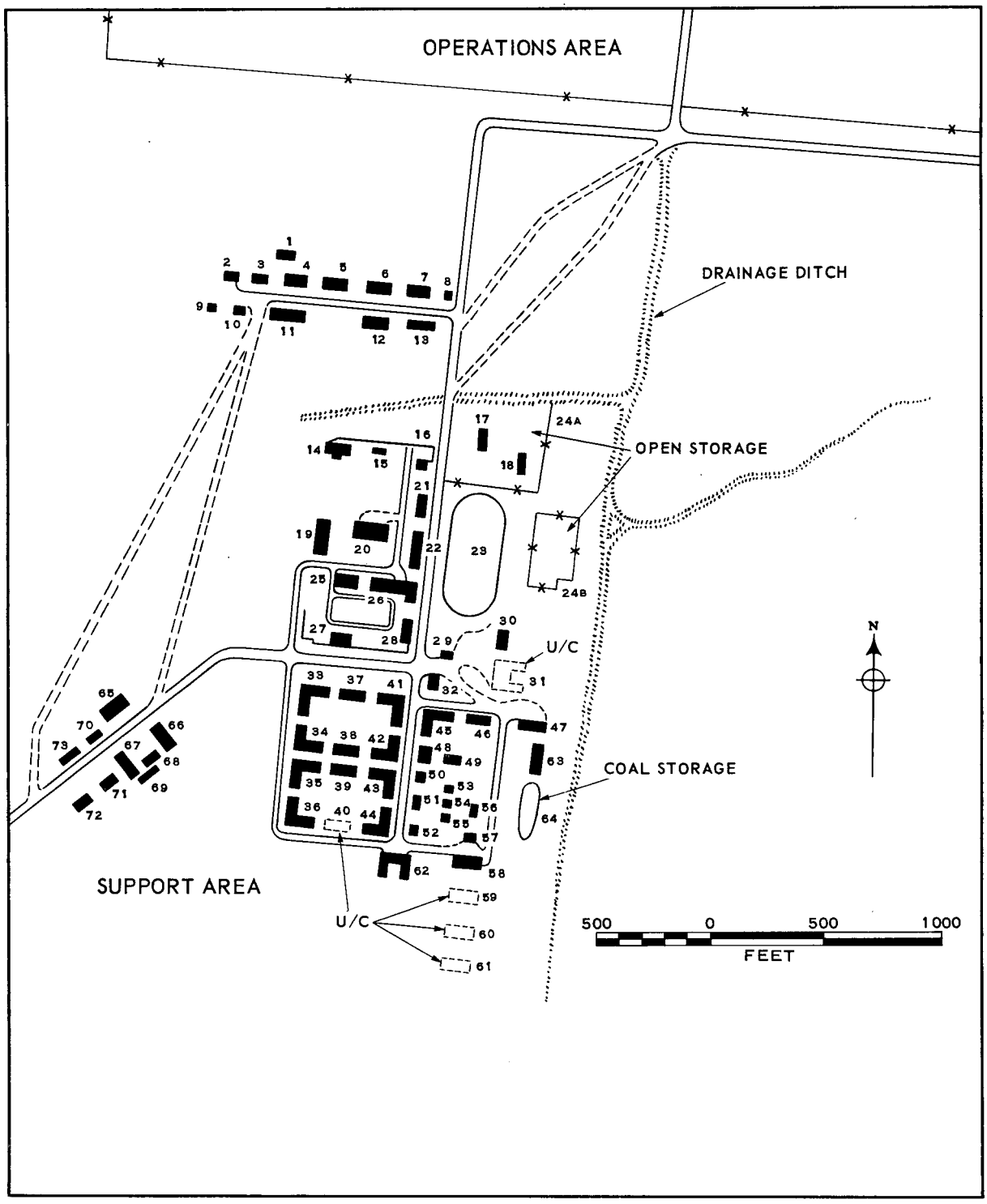

FIGURE 4. SUPPORT AREA AT INSTALLATION NO. 1.

Table 4. Structures in Support Area, Installation No. 1 (Continued)

Item	Identification	No. of Stories	Roof Type	Dimensions
27	Support-type bldg.	1	Hipped	
28	Support-type bldg.	1	Hipped	
29	Support-type bldg.	1	Hipped	
30	Support-type bldg.	1	Hipped	
31	Support-type bldg., C-shaped	---	U/C	105 x 50 (base) 55 x 50 (legs)
32	Support-type bldg.	1	Unknown	60 x 30
33-36	Barracks-type bldgs., L-shaped	2	Valley	125 x 45 (base) 80 x 45 (leg)
37-39	Barracks-type bldgs.	2	Hipped	125 x 45
40	Barracks-type bldg.	2	U/C	125 x 45
41-45	Barracks-type bldgs., L-shaped	2	Valley	125 x 45 (base) 80 x 45 (leg)
46	Barracks-type bldg.	2	Hipped	125 x 45
47	Support-type bldg.	1	Gable	120 x 45
48	Support-type bldg.	1	Complex	
49	Support-type bldg.	1	Gable	
50	Support-type bldg.	1	Unknown	
51	Support-type bldg.	1	Gable	
52	Support-type bldg.	1	Unknown	
53-55	Support-type bldgs.	1	Unknown	
56	Support-type bldg.	1	Gable	
57	Support-type bldg.	1	Gable	
58	Support-type bldg.	1	Gable	
59-61	Unknown	Unknown	U/C	
62	Administrative bldg., C-shaped	1	Valley	
63	Possible power or heating plant	Unknown	Complex	120 x 50
64	Coal pile	---	-------	13,200 sq. ft.
65	Support-type bldg.	1	Gable	115 x 30
66-67	Support-type bldgs.	1	Gable	
68	Support-type bldg.	1	Gable	
69	Support-type bldg.	1	Gable	
70-72	Support-type bldgs.	1	Gable	
73	Support-type bldg.	1	Gable	

25X1

25X1

25X1

III. INSTALLATION NO 2, POSSIBLE JAMMING STATION (41°42'N/44°49'E)

A self-supporting lattice tower of the palm-tree design, which is the type assumed to have a jamming capability, is located in Tbilisi, approximately 3.2 miles south-southeast of the Tbilisi railroad station (Figure 1, item 2). The tower is in the southeast corner of a park that is bordered on the south by Khodzhevanskaya Street and on the northeast by the rail line passing through Tbilisi. Although the tower is identified on [redacted] photo-

25X1

graphy, the obliquity and small scale preclude its measurement. A collateral source 1/ and ground photographs [redacted] 25X1 indicate that the tower is of the same design and construction as the palm-tree towers identified in the Moscow area. The same collateral source also states that the tower is supporting several cage-type antennas. 1/ Although these antennas are not visible on the aerial photography, they are probably anchored to the tower base.

IV. INSTALLATION NO 3, RADIO BROADCASTING STATION (41°40'N/44°52'E)

This station is 6.3 miles southeast of the Tbilisi railroad station and 0.32 miles northwest of Tbilisi Airframe Plant No 31 (Figure 1, item 3). The station, which is used for local broadcasting, is fenced and road-served and covers approximately 30 acres. Aerial photography of [redacted] and ground 25X1 photography of 1958 [redacted] show that the station facilities consist primarily of a transmitter building with an adjacent cooling pond, several support-type buildings, two guyed sectional steel towers, and one guyed mast (Figure 5). [redacted] 25X1

[redacted] 25X1

A. Antennas

The two sectional steel towers (Figure 5, items A and B) are approximately 300 feet high and 490 feet apart. Although guy anchor bases are not apparent on the photography, the height and construction of the towers necessitate guying. The absence of tuning houses at the base of the towers and the presence of a transmitter building (item 11) midway between the towers indicate that the towers probably support an antenna of the horizontal-dipole type. A perpendicular bisector of a line drawn between the two towers has an azimuth of [redacted] degrees. The guyed mast (Figure 5,

25X1

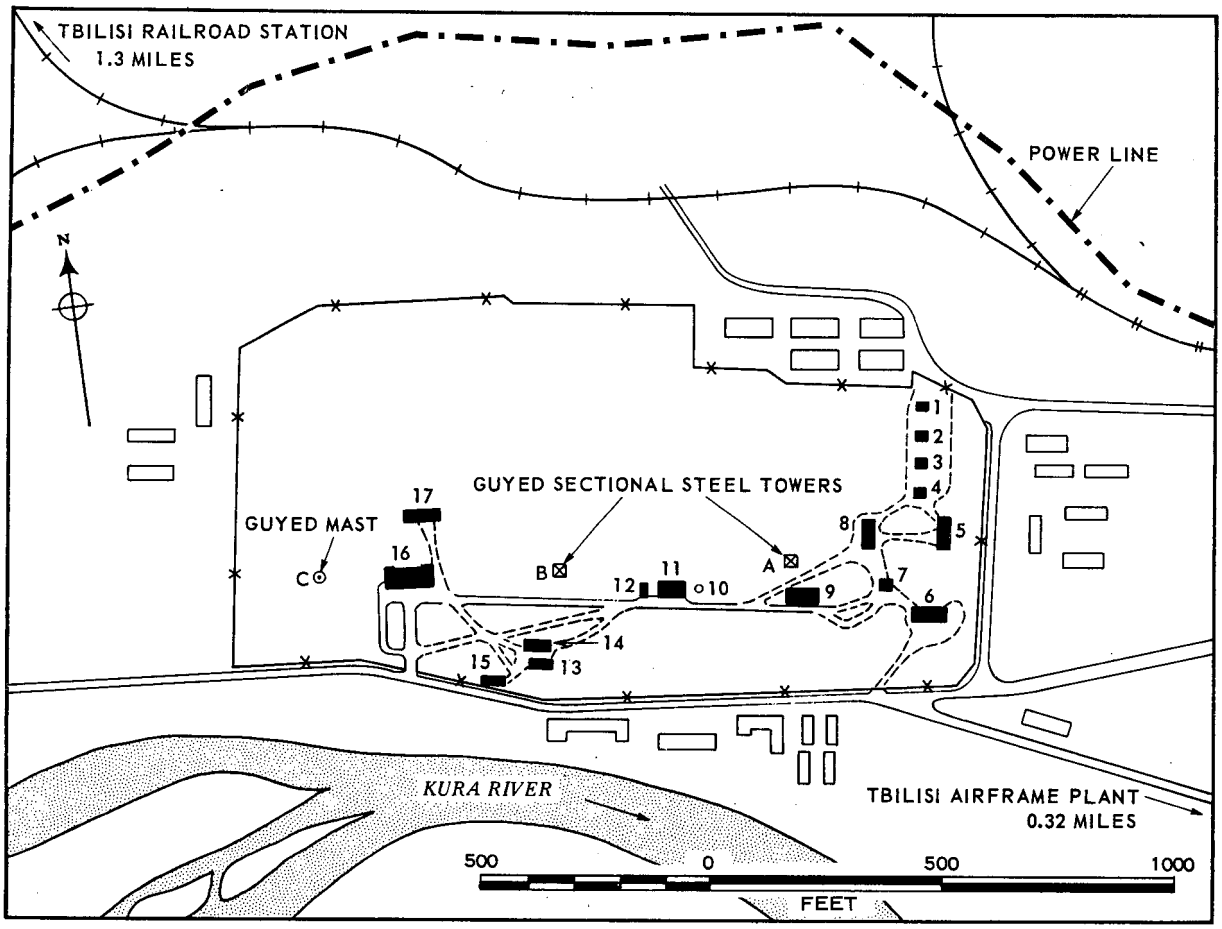

FIGURE 5. INSTALLATION NO. 3, RADIO BROADCASTING STATION AT TBILISI. This station, which covers 30 acres, is used for local broadcasting.

Table 5. Structures at Installation No. 3

Item No.	Identification	No. of Stories	Roof Type	Dimensions (ft.)
1-4	Support-type bldgs.	1	Gable	35 x 30
5	Support-type bldg.	1	Gable	90 x 30
6	Barracks or administration bldg.	2	Hipped	115 x 45
7	Support-type bldg.	1	Gable	30 x 25
8	Support-type bldg.	1	Gable	100 x 45
9	Support-type bldg.	2	Gable	100 x 45
10	Cooling pond	-----	-------	30 (dia.)
11	Transmitter bldg.	2	Complex	85 x 40
12	Support-type bldg.	1	Gable	[redacted]
13	Support-type bldg.	1	Gable	60 x 30
14	Support-type bldg.	1	Gable	85 x 30
15	Support-type bldg.	1	Gable	90 x 20
16	Administration bldg.	2	Valley	115 x 60
17	Support-type bldg.	1	Gable	130 x 30

25X1

item C), approximately 275 feet high, is located 515 feet northwest of one sectional steel tower (item B). One other mast, in addition to the sectional steel towers and guyed mast, is visible on 1958 ground photography.

B. Structures

The major structures within the station area are tabulated in Table 5 (item numbers are keyed to Figure 5).

C. Overhead Power and/or Communication Lines

An east-west power line is located 600 feet north of the radio station, but no connection between this line and the radio station can be determined.

V. INSTALLATION NO 4, TELEVISION STATION (41°43'N/44°46'E)

This station, the Tbilisi television station, is located on top of Mount David, adjacent to the Stalin Park and Restaurant and 2.5 miles southwest

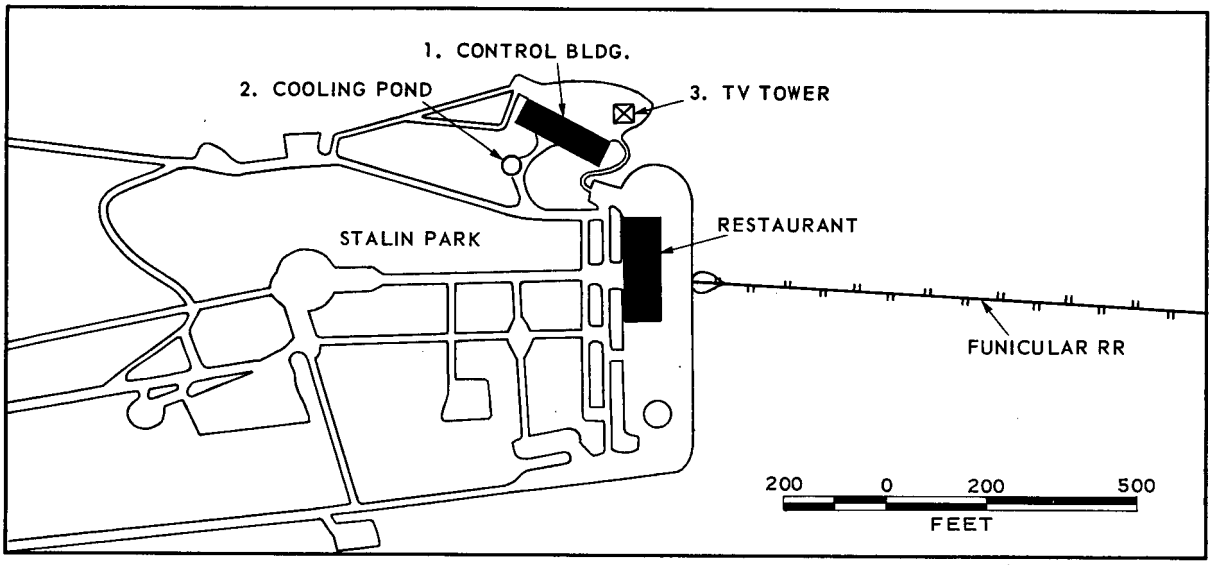

FIGURE 6. INSTALLATION NO. 4, TELEVISION STATION AT TBILISI.

of the Tbilisi railroad station (Figure 1, item 4). The station facilities consist of a one-story control building 180 by 55 feet with a complex roof (Figure 6, item 1), a cooling pond 40 feet in diameter (item 2), and a tower 590 feet high (item 3). The tower is of steel lattice design and has circular platforms at approximately the 400-foot and 480-foot levels. There are no apparent power lines in the vicinity of the station. Access to the station is via Stalin Park, which is serviced by a road and a funicular rail line from Tbilisi.

VI. INSTALLATION NO 5, RADIO STATION (41°43'N/44°52'E)

This radio station is located 3.8 miles east-southeast of the Tbilisi railroad station and 14.4 miles northwest of Rustavi (Figure 1, item 5). The station site, which is road served, covers approximately 80 acres and contains a control building, two support-type buildings, and three double rhombic antenna arrays. As shown on Figure 7, an area surrounding the control building is covered with ground scars, which preclude identification of additional masts and/or arrays. There are no cooling facilities to indicate transmitting capability.

A. Antennas

Table 6 gives the pertinent data on the rhombic antennas at Installation No 5.

Table 6. Rhombic Antennas, Installation No. 5

Antenna	Length of Major Axis (ft.)	Length of Minor Axis (ft.)	Separation of End Masts (ft.)	Estimated Height of End Masts (ft.)	Estimated Height of Side Masts (ft.)	Computed Tilt Angle (° ')	Azimuth of Major Axis (°)
A	585	305	100				
B	585	305	100				
C	560	325	100 (approx)				

B. Structures

The major structures within the station area are tabulated in Table 7 (item numbers are keyed to Figure 7).

Table 7. Structures at Installation No. 5

Item No.	Identification	No. of Stories	Roof Type	Dimensions (ft.)
1	Support-type bldg.	1	Gable	20 x 20
2	Support-type bldg.	1	Gable	140 x 55
3	Support-type bldg.	1	Gable	30 x 20
4	Support-type bldg.	1	Gable	30 x 25
5	Security bldg.	1	Gable	25 x 20
6	Support-type bldg.	1	Shed	110 x 30
7	Support-type bldg.	1	Gable	20 x 20
8	Support-type bldg.	1	Shed	35 x 30
9	Control bldg.	2	Complex	90 x 35
10	Support-type bldg.	1	Gable	160 x 45

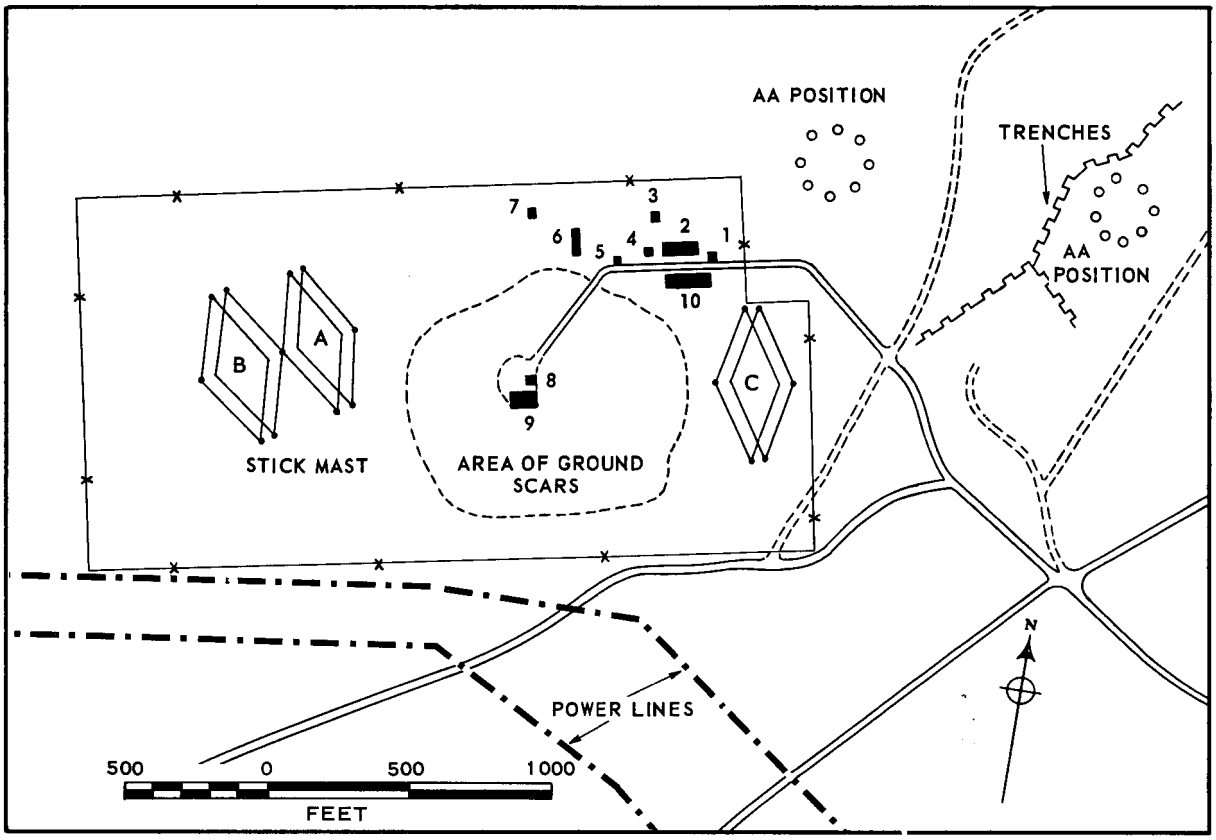

FIGURE 7. INSTALLATION NO. 5, RADIO STATION NEAR TBILISI. The three rhombics are the only identifiable antennas.

C. Overhead Power and/or Communication Lines

An overhead power line parallels the south fence line of the station. A possible junction or connection between this power line and the station may be made at the southwest corner of the site, but poor resolution precludes positive identification of such a connection.

VII. INSTALLATION NO 6, RADIO STATION (41°42'N/44°53'E)

This radio station is located 4.4 miles east-southeast of the Tbilisi railroad station and 14 miles northwest of Rustavi (Figure 1, item 6). The road-served station is 0.6 miles southeast of Installation No 5. Although the limits of the station cannot be determined, the station facilities consist of a control building, 3 support-type buildings, a cooling pond, 2 double rhombic arrays, 2 H-type antenna supports, and 2 stick masts (Figure 8).

A. Antennas

The two rhombic arrays (Figure 8, items A and B) are oriented on the same azimuth and located side by side. There is a difference in dimensions (see Table 8) which may indicate that they function as a day-night transmitting unit. The possible night rhombic (item B) has a possible dissipation line extending along the major axis. The two masts items C and D), which are approximately 110 feet high, are spaced between the rhombics. The two H-type supports (items E and F), approximately 150

Table 8. Rhombic Antennas, Installation No. 6

25X1

25X1

Antenna	Length of Major Axis (ft.)	Length of Minor Axis (ft.)	Separation of End Masts (ft.)	Estimated Height of End Masts (ft.)	Estimated Height of Side Masts (ft.)	Computed Tilt Angle (° ')	Azimuth of Major Axis (°)
A	[redacted]	480	90	90	Undetermined	[redacted]	
B	430	280	[redacted]	Undetermined	Undetermined		

feet high, appear to be of steel construction; each consists of two poles with an extended crossarm on top. A perpendicular bisector of a line projected between the supports has an orientation of 100/280 degrees. Table 8 gives data on the two rhombics.

B. Structures

Data on the major structures at the station are given in Table 9 (item numbers are keyed to Figure 8).

Table 9. Structures at Installation No. 6

Item No.	Identification	No. of Stories	Roof Type	Dimensions (ft.)
1	Control bldg.	1	Complex	100 x 60
2	Support-type bldg.	1	Gable	[redacted]
3	Support-type bldg.	1	Unknown	
4	Support-type bldg.	1	Gable	30 x 20
5	Cooling pond	------	------	[redacted]

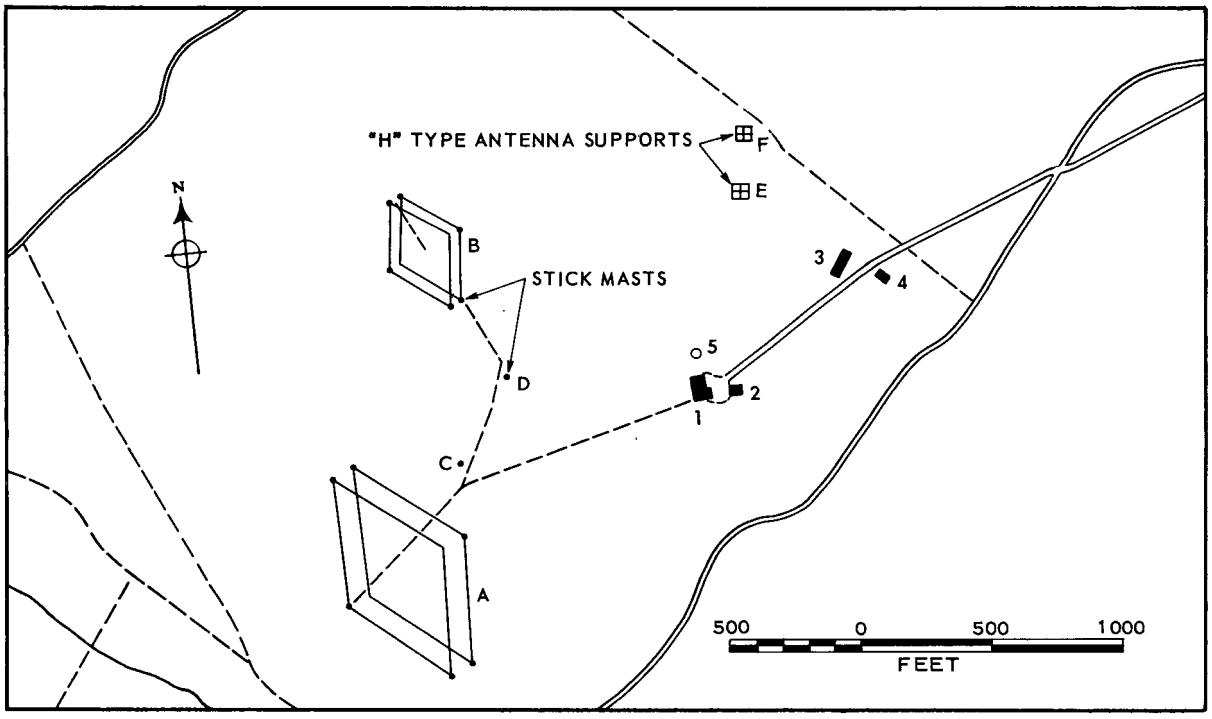

FIGURE 8. INSTALLATION NO. 6, RADIO STATION NEAR TBILISI. The two double rhombics may function as a day-night transmitting unit.

VIII. INSTALLATION NO 7, RADIO STATION (41°44'N/45°11'E)

This radio station, located 19 miles east of the Tbilisi railroad station and 19.4 miles northeast of Rustavi (Figure 1, item 7), is road-served and lies adjacent to the all-weather, two-lane, hard-surface Tbilisi/Sartichala road. Although the boundaries of the station site cannot be clearly identified 25X1 on [redacted] photography, a possible wire fence (as shown on Figure 9) may enclose part of the installation. Structures at the station include a control building, 3 barracks buildings, and 13 support-type buildings (Figure 10). A cooling pond is located west of the control building. Antennas include 5 fishbone arrays and 3 double rhombic arrays; there are also 10 individual masts on the site.

A. Antennas

Antennas at the station consist of fishbone and rhombic arrays, indicating a receiving capability. The presence of the cooling pond suggests that the station may also have a transmitting capability. Two of the rhombics (Figure 10, items F and H) are oriented on the same azimuth. The fishbone arrays are of types normally found within the USSR. Because of the 25X1 obliquity of the photography, all measurements given are approximate. The pole height for fishbone arrays A, B, C, and E is [redacted] while array D is [redacted] high. The ten single-pole masts (items I-R) range in height from 25X1 120 to 160 feet. Tables 10 and 11 give data on the fishbone and rhombic antennas, respectively (item letters are keyed to Figure 10).

Table 10. Fishbone Antennas, Installation No. 7

Antenna	Type	Length (ft.)	Width (ft.)	Azimuth Orientation (°)
A	A	310	80	[redacted] 25X1
B	A	310	80	
C	A	310	80	
D	E	100	45	
E	A	310	80	

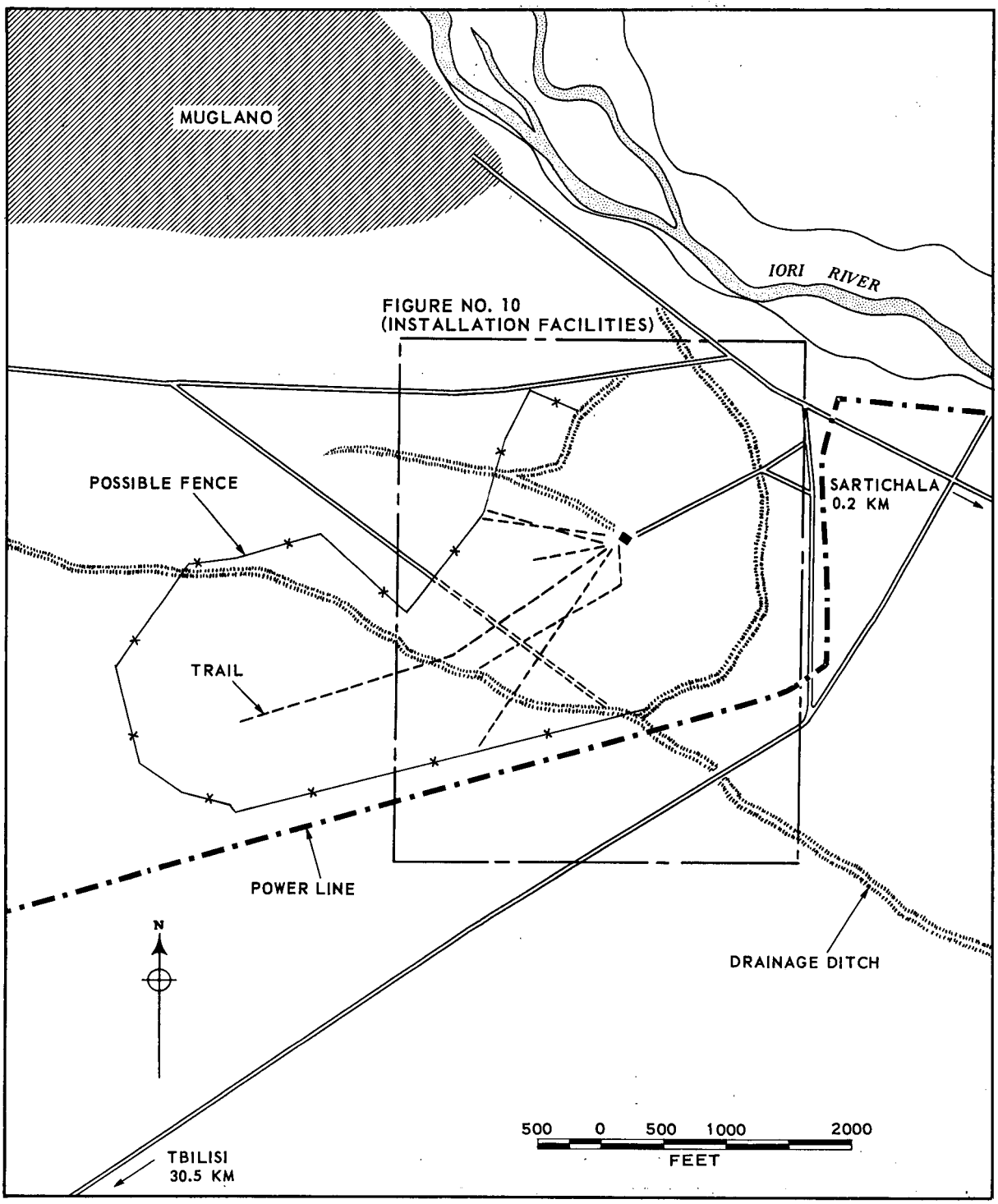

FIGURE 9. INSTALLATION NO. 7, RADIO STATION EAST OF TBILISI. Details of the installation are shown on Figure 10.

Table 11. Rhombic Antennas, Installation No. 7

Antenna	Length of Major Axis (ft.)	Length of Minor Axis (ft.)	Separation of End Masts (ft.)	Estimated Height of End Masts (ft.)	Estimated Height of Side Masts (ft.)	Computed Tilt Angle (° ')	Azimuth of Major Axis (°)
F	730	350	80	Unknown	Unknown	[redacted]	
G	730	350	80	Unknown	Unknown		
H	730	350	80	Unknown	Unknown		

25X1

B. Structures

The major structures in the installation area are tabulated in Table 12 (item numbers are keyed to Figure 10).

Table 12. Structures at Installation No. 7

Item No.	Identification	No. of Stories	Roof Type	Dimensions (ft.)
1	Control bldg.	2	Hipped	[redacted]
2	Support-type bldg.	1	Unknown	40 x 30
3	Support-type bldg.	1	Unknown	40 x 35
4	Support-type bldg.	1	Unknown	30 x 20
5	Support-type bldg.	1	Gable	[redacted]
6-8	Barracks bldgs.	2	Gable	120 x 55
9	Support-type bldg.	1	Unknown	20 x 20
10	Support-type bldg.	1	Gable	[redacted]
11	Support-type bldg.	1	Gable	20 x 20
12	Support-type bldg.	1	Gable	30 x 20
13	Support-type bldg.	1	Gable	[redacted]
14	Support-type bldg.	1	Hipped	
15	Support-type bldg.	1	Hipped	90 x 40
16	Support-type bldg., T-shaped	1	Shed	[redacted]
17	Support-type bldg., L-shaped	1	Shed	130 x 30 (base) 210 x 30 (leg)
18	Cooling pond	-------	----------	30 (dia.)

25X1 25X1 25X1 25X1 25X1

C. Overhead Power and/or Communication Lines

A power line parallels and passes within 300 feet of the south side of the station, but it is impossible to determine if a connection exists between the line and the station site.

PIC/JR-4/60

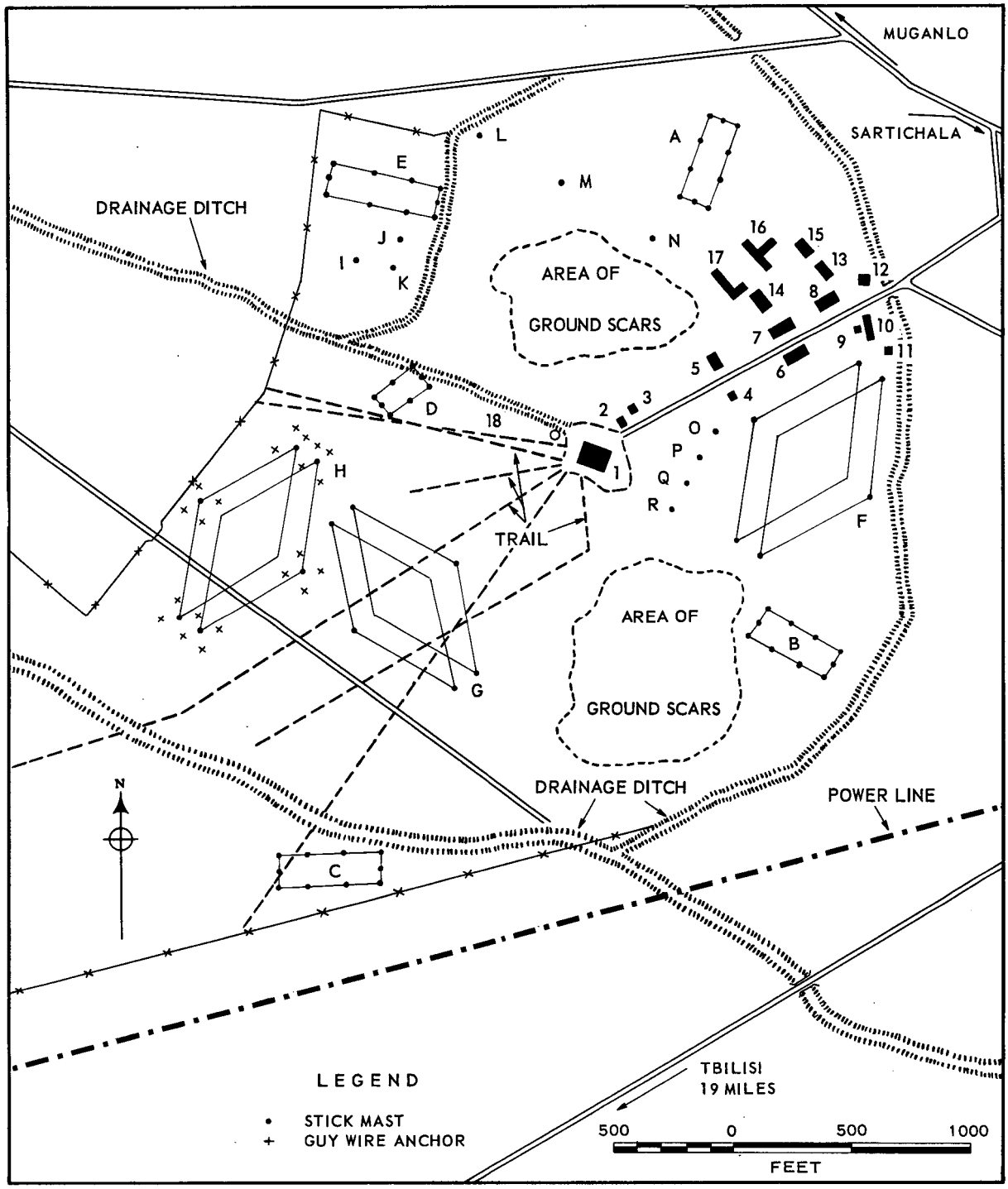

FIGURE 10. DETAILS OF INSTALLATION NO. 7. This station probably has both receiving and transmitting capabilities.

Next 2 Page(s) In Document Exempt

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